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Acbar Power Spectrum Kuo et al.
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High Resolution Observations of the CMB Power Spectrum with Acbar

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abstract

We report the first measurements of anisotropy in the cosmic microwave background (CMB) radiation with the Arcminute Cosmology Bolometer Array Receiver (Acbar). The instrument was installed on the 2.1 m Viper telescope at the South Pole in January 2001; the data presented here are the product of observations up to and including July 2002. The two deep fields presented here, have had offsets removed by subtracting lead and trail observations and cover approximately $24\,\mathrm{deg}^2$ of sky selected for low dust contrast. These results represent the highest signal to noise observations of CMB anisotropy to date; in the deepest 150 GHz band map, we reached an RMS of $\sim 8.0\,\mu$K per $5'$ beam. The 3 degree extent of the maps, and small beamsize of the experiment allow the measurement of the CMB anisotropy power spectrum over the range $\ell = 150 - 3000$ with resolution of $\Delta\ell = 150$. The contributions of galactic dust and radio sources to the observed anisotropy are negligible and are removed in the analysis. The resulting power spectrum is found to be consistent with the primary anisotropy expected in a concordance ΛCDM Universe.